Smart Technology Applications in Exercise and Care for Community-Dwelling Older Adults
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Purpose As population ageing becomes an increasingly pressing global issue, Taiwan is projected to enter a super-aged society in 2026. Older adults face a wide range of health problems and challenges [1, 5, 8]. Accordingly, health promotion and healthcare for older adults are becoming ever more important. Alongside modern societal development, the accelerated adoption of smart technologies has been widely observed and encouraged [5, 6, 7, 8]. Guided by an ecological model and grounded in the American College of Sports Medicine (ACSM) recommendations, this study developed a practice-based program that encourages older adults to participate in diversified exercise plans—aerobic, muscular strength, balance, and flexibility training [1, 2]. The program aimed to promote holistic physical health among older adults by integrating smart-technology applications and exercise equipment—including stability balls, resistance bands, resistance rings, balance pads, and a ball-throwing game using red/yellow/green basket-light recognition—as instructional supports. Appropriate music was incorporated during exercise to foster a joyful and motivating class atmosphere, enhance participation interest, and cultivate sustainable home-based exercise habits [2, 6, 7], [8]. **Methods** This study drew on the ecological model proposed by Sallis et al. [3, 4] and the seven forward-looking development domains for smart technology and elderly care proposed by Yeh-Liang Hsu and Bai Li [5] as its theoretical foundation. A qualitative research design was adopted, using observation, diaries, interviews (including a bodily awareness scale), and grounded theory to collect and analyze the status quo of the community care setting, as well as participants' engagement rationales and core values, at the Ganxi Village Community Care Center in Citong Township, Yunlin County. **Results and Discussion** An ecological-model approach that integrates smart-technology applications with equipment-assisted instruction appears to encourage older adults to participate in diversified exercise programs in a more regular and sustained manner. Across the program, participants reported that the sessions supported exercise performance that felt more correct and effective while remaining enjoyable, and they also highlighted the practical convenience enabled by smart technologies. Beyond individual-level outcomes, leveraging smart technologies within a localized ecological operating model—embedded in a culturally diverse community context—may generate broader community value, including potential contributions to local development (e.g., agricultural tourism), thereby supporting a sustainable framework for technology-enabled exercise participation alongside a comfortable, age-friendly living environment. Following the 6-week intervention, older adults showed improvements in physical activity levels and exercise-related outcomes across the four modalities (aerobic, strength, balance, and flexibility), and they generally perceived that the integration of smart technologies was beneficial to both physical and mental health, as well as to maintaining a more comfortable home environment [1, 2, 5, 6, 7], [8]. These findings advance understanding of how smart-technology-enabled exercise participation models may enhance functional health among older adults across different exercise schemes in terms of effectiveness, correctness, necessity, sustainability, and appropriateness [1, 2, 5]. Regarding public resource allocation, governmental investment may need to shift from primarily subsidizing smart-technology products and care-system construction toward emphasizing the integration of smart technologies into the everyday living and care-delivery processes of older adults as an essential component of implementation [5, 6].

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